THREE ways to MAKE an OCEAN CROSSING

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CRUISING WORLD
November/December 2019

cruisingworld.com
Of NEEDLES and HAYSTACKS

In a crew-overboard situation, the latest emergency rescue gear goes a long way toward enabling a successful outcome.

ELECTRONICS BY DAVID SCHMIDT

While safety tethers and lifelines are the first line of defense when it comes to keeping everyone on board, the hard-boiled reality is that people still end up in the water. Fortunately for sailors, electronic safety technologies have evolved to give those still on board a better chance of ensuring help is on the way. Here, then, is a look at the latest electronic emergency kits for cruisers.

When it comes to electronics and safety at sea, the conversation begins with emergency position-indicating radio beacons. These life-saving devices are registered to the vessel—not its individual sailors—and broadcast on the 406 MHz and 121.5 MHz frequencies. Today’s EPIRBs have a 360-degree strobe light and, depending on the model, they can be activated manually or triggered hydrostatically.

Once active, EPIRBs transmit a satellite distress message on the 406 MHz frequency for a minimum of 48 hours. These signals are received globally by satellites operating on the International Cospas-Sarsat Programme’s three satellite networks: Low-Earth Orbiting Search and Rescue, Geostationary Orbiting Search and Rescue, and the still-being-completed Medium-altitude Earth Orbiting Search and Rescue. When picked up by the satellites, distress signals are relayed down to ground-based local user terminals. The LUTs determine the beacon’s location (see below) and pass this data along to Cospas-Sarsat’s central mission control center, which generates an alert message that’s sent to the geographically correct rescue coordination center. It, in turn, attempts to contact the EPIRB’s registered user (and/or their emergency contacts), while also dispatching a search-and-rescue team. Once on scene, rescuers use specialized homing equipment to follow the EPIRB’s 121.5 MHz signal for their “final-mile” search.

Almost all contemporary EPIRBs include a high-performance, multichannel GPS receiver that allows the beacon to bundle its location information with its 406 MHz emergency signal, but, should this fail (or if an EPIRB doesn’t have GPS capabilities), the Cospas-Sarsat network can calculate the beacon’s position using Doppler processing. While effective, it can take several satellite passes to achieve a proper fix because each satellite network handles data differently. MEOSAR and GEOSAR, for instance, deliver much quicker service than the older LEOSAR network.

Attentive readers will know that GPS, or the Global Positioning System, is part of the Global Navigation Satellite System, which also includes satellites from the European Union’s Galileo network, Russia’s GLONASS system and China’s BeiDou constellation. Next-generation EPIRBs and other devices (more on this in a minute) that operate on both the GPS and Galileo networks are expected to reach chandlery shelves by late 2019 or early 2020, and will enable faster, more precise signal reception and tracking. This capability will also allow the system to deliver a reassuring (and possibly lifesaving) Return Link Service (RLS) to the EPIRB. (This feature is forecast to go live in late 2020.)

“RLS sends a signal back along the search-and-rescue ecosystem to the 406 MHz beacon that originated the distress alert,” says Sean McCrystal, the senior maritime marketing manager at Orolia Maritime, the manufacturer of the McMurdo, Kannad and Netwave brands. “The signal flashes on the beacon to confirm that the distress alert has been received and that help is being organized. This reassurance signal allows those in distress to make decisions based on a better understanding of their situation.” The hope is that it will reduce fatalities from people taking misguided risks based on a lack of information and feeling they have nothing else to lose, he adds.

TWO IN ONE

While Cospas-Sarsat has been credited with saving more than 46,000 lives since 1982, one obvious shortcoming is that other nearby vessels, which are often significantly closer to the scene than the United States Coast Guard or other responders and therefore able to render help faster, are electronically blind to unfurling emergencies. Because of this, McMurdo introduced its revolutionary Smartfind G8 AIS in fall 2018, which was the first combined AIS and Galileo-enabled EPIRB. As its suggestive moniker implies, this EPIRB transmits...
**BOATS & GEAR**

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When it comes to electronics and safety at sea, the conversation begins with emergency positions-indicating radio beacons. These life-saving devices are registered to each vessel—and broadcast on the VHF and MF/HF frequencies. Today’s EPIRBs have a 360-degree strobe light and, depending on the model, they can be activated manually or triggered hydrostatically. Once activated, EPIRBs transmit a distress signal message on the 406 MHz frequency for a minimum of 48 hours. These signals are received globally by satellites operating on the International Cosasat-2000 bus. The COSASAT-2000 can detect a distress alert on the 406 MHz emergency signal, and, should that fail (or if an EPIRB doesn’t have GPS capabilities), it can detect from satellite signals the distress alarm on the 121.5 MHz band. Almost all contemporary EPIRBs include a high-performance, multihop GPS receiver that allows the beacon to bundle its location information with its 406 MHz emergency signal, but should this fail (or if an EPIRB doesn’t have GPS capabilities), the COSASAT-2000 can calculate the beacon’s position using Doppler processing. While effective, it can take several satellites to achieve a proper fix because each satellite network handles data differently: the 406 MHz system is a hybrid system that uses both ground-based and satellite-based navigation systems. This is because of the Global Navigation Satellite System, which includes satellites from the three leading satellite operators: the Russian SAOCOM system and Spain’s Inmarsat system. Next-generation EPIRBs and other devices operate on several frequencies that are designed to increase the chances of locating a vessel. These include the INMARSAT system, which is designed to detect distress signals from vessels equipped with the 406 MHz system. The EPIRBs are designed to detect these signals and alert the nearest coastguard station. This capability will allow the user to deliver a reassuring message to the nearest lifeboat.
at all times, and are designed to fit neatly into pockets and inflatable life jackets.

TETHERED CREW
Recent years have seen marine electronics companies leverage Bluetooth capabilities to create next-generation overboard alarms that are aimed at self rescue rather than a Copra-Sat response. A pioneering example of this is Weems and Plath's Crew Watcher, which uses a small, pocket-friendly beacon (hint: it's also dog-collar friendly) and a smartphone app. Should someone fall overboard, the radio-frequency link between the beacon and the smartphone is broken when the beacon is submerged or separated by distance, triggering an alarm on the phone. The phone also records its position at the time that the electronic tether snaps, and the app can navigate back to the scene of the splash. Likewise, ACR's new

VENDOR INFORMATION
ACR: acr-truss.com, $55-$180
Ocean Signal: wwwмещен.com, $49-$119
Knorr-emoji.com, $100-$149
Netwie: weems.com, $100-$159
MCD: weems.com, $100-$149
Fell Marine: fellmarine.com, $100
Weems and Plath: weems-plath.com, $50-$870

Overboard Location Alert System offers comparable capabilities, starting with the OLAS Crew Tag. These tiny wrist-worn pendants house a small, waterproof Bluetooth transmitter that electronically pairs with ACR's app. The app tracks Crew Tags within a 50-foot radius. Should a Crew Tag break RF contact with the smartphone, the app marks the tag's location and provides return routing. The company's OLAS Boat On offers similar capabilities as the Crew Tag but with an LED flashlight, a strobe and a rechargeable battery.

One idea for cruisers who are reluctant to buy a PLB and an AIS MOB is to instead carry a PLB and a Bluetooth device. "We're going to bundle OLAS products with PLBs," D'Arcangelo says. "It's the fastest and easiest way to turn a PLB into a real MOB alarm."

While this setup would serve to alert one's own vessel of a crewmember-falling-overboard event, prospective buyers need to understand that OLAS equipment can't contact other nearby vessels. For anyone interested in further expanding an OLAS setup, ACR makes a USB-powered portable base station that can track every Crew Tag, without relying on a phone. Also, D'Arcangelo says, ACR is working to make OLAS compatible with NMMA Offshore 2000 networks, which will open the door to plotting OLAS-assisted MOB incidents on a networked chart plotter.

And for shorthanded or single-handed cruisers who regularly start the motor when the air gets light, some of the next-generation Bluetooth and wireless systems also offer engine kill switches. For example, Fell Marine offers a line of pendant-style beacons that can stop props, while ACR's OLAS Guardian offers a similar response.

Finally, for anyone who cruises on a large sailboat, ACR's OLAS Extender delivers signal-repeater capabilities and can expand the system to monitor up to 15 Crew Tags throughout the vessel.

David Schmidt/Cruising World